INVASION OF NON-NATIVE TREES ON RECLAIMED SURFACE MINES OF THE SOUTHERN CUMBERLAND PLATEAU[1]

Dawn Lemke[2], Callie Schweitzer, Yong Wang, Dana Virone

Abstract: Throughout the world, the invasion of non-native plants is an increasing threat to native biodiversity. Invasion is especially prevalent in areas affected by land transformation and anthropogenic disturbance. The numerous surface mines along the Southern Cumberland Plateau are a source of disturbance and may intensify the rate of invasive plant introduction. In this study, forest communities were studied on reclaimed surface mines of the Southern Cumberland Plateau. Our goal was to examine the variation of tree species richness and composition in relation to environmental variables and the presence of non-native invasive species.

Sampling plots were established and sampled during the summer and fall of 2010 on reclaimed mines throughout west central Alabama. Plots were located on both public and private lands in Walker, Tuscaloosa, Shelby, and Bibb counties on mines permitted since 1978. Plot selection was based on a Generalized Random Tessellation Stratified design. A total of 352 plots were sampled and over 19,000 trees were tallied. Each circular plot had a radius of 37.2 feet. Within the plot all trees were identified to the species level and categorized by diameter. Non-native invasive species were identified and measured for abundance. Soil and tree core samples were collected along with various environmental data variables such as leaf litter depth and canopy cover. If invasive species were present in the plot, additional plots were established 110 feet north, south, east, and west from the plot center to determine the extent of invasion. Canonical correlation analysis was used to examine the relationships between the invasive plant community and the forest community.

We found invasive tree species were present on 113 plots and included mimosa (*Albizia julibrissin*), Paulownia (*Paulownia tomentosa)*, Chinese privet (*Ligustrum sinense*), and tree-of-heaven (Alianthus altissima). The most common native tree species included loblolly pine (*Pinus taeda*), Virginia pine (*Pinus virginiana*) and sweetgum (*Liquidambar styraciflua*).The most common invasive tree species was Chinese privet, which occurred on 68 of the sampled plots. The canonical correspondence analysis using the 30 most common tree species indicated invasive trees tended to be associated with plots characterized by low overall species diversity. Invasive trees also tended to occur in areas where overall invasive richness was high, and these areas often supported invasive vine (*Lonicera japonica*) and forb (*Lespedeza spp.*) growth and thus a more dense understory. Further analysis will assist in identifying other factors impacting species distribution patterns.

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[2] Dawn Lemke is a Research Associate, Alabama A&M University, Normal, AL, 35762 and a PhD Candidate, Canterbury University, Christchurch, NZ, Callie Schweitzer is a Research Forester at USDA Forest Service, Southern Research Station, Normal, AL, 35762, Yong Wang is a Biometry and Wildlife Ecology Professor at Alabama A&M University, Normal, AL, 35762, and Dana Virone is a Technician at Alabama A&M University, Normal, AL, 35762.